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ABSTRACT

An analysis of the rationale, concepts and procedures for designing and implementing a model of decision-making for teachers engaged in developmental research is presented. The decision-making model is conceptualized as the intersection of four sets of data sources derived from the performance of preactive/planning tasks, interactive/implementation tasks, and reflective/effectiveness evaluation tasks. The performance of preactive/planning tasks produce data regarding the characteristics of the learning environment the teacher-researcher intends to create in order to produce a selected learning outcome in the form of covert or overt behaviors exhibited by pupils. The performance of the interactive/implementation tasks produce data regarding the characteristics of the actual learning environment which was created and the actual pupil responses or behaviors which were exhibited. The performance of the reflective/effectiveness evaluation tasks produce data regarding the relationships between the intended and actual learning environment and learning outcomes. The model components are used to construct a strategy for identifying the potential value of each of the data sets (constructed by the teacher-researcher) for evaluating planning effectiveness, implementation effectiveness, model effectiveness, and adaptation effectiveness. A taxonomy of pedagogical objectives is presented as a potential product of the teaching effectiveness inquiries (developmental research) conducted by teacher-researchers and a means of constructing and organizing a knowledge base for the teaching profession. (Author)

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A Model of Decision-Making for Teachers Engaged in Developmental Research

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In order to provide effective support for the personal and professional development of teachers, Robert McNergney (1980) suggests that teacher educators begin to organize their research and practice in a way that reflects a greater concern for differences between teachers in terms of their individual needs and abilities and the types of tasks they face. McNergney offers a scheme for conceptualizing teacher development as an interactive relationship between four variables: 1) the tasks (T) that teachers must accomplish to fulfill their roles, 2) the behaviors (B) or observable indicators of teachers' abilities to perform those tasks, 3) the environment (E) to which the teacher is exposed and 4) the personal (P) aptitudes, traits and needs of the teacher.

Taking the perspective of the teacher educator, the variables were rearranged to read P: T: E = B. "This can be translated to mean that different teachers or persons (P), undertaking various tasks (T), must be supported in different ways (E), in order to demonstrate particular behaviors (B)" (1980, p. 235).

The implication of this concept for the design of curriculum and instruction in teacher education is that the learning environments to which teachers are exposed must be fundamentally adaptive in structure and function if they are to be "developmental" in their effect.

The system by which the content, objectives, and instructional strategies are selected, invented, and sequenced for the training program must be capable of generating learning environments that exhibit a level diversity and complexity equivalent to that which characterizes the environments in which the tasks of teaching are performed.

In order to construct an effective educational environment for preservice teachers, the design of the curriculum and the types of instructional strategies employed must also be congruent with the objetives to be achieved.

The objectives around which developmental environments for teachers may be organized take their form from and are controlled by the way in which the tasks of teaching are conceptualized.

Among teacher educators, the peceived need to identify and establish a list of essential pedagogical knowledge and skill competencies, upon which programs for teacher education could be built, and through which the long-sought goal of professionalized teaching could be achieved, has led to the production and implementation of a wide variety of models for curriculum design. In an analysis of the trends in the design models employed between 1961 and 1980, Elizabeth Nelli (1981) notes that the search for generic competencies has had the effect of generating great diversity in the production of models for designing teacher education curricula. The domains of competencies in the lists of essential knowledge and skills that emerge from the generic models often overlap, even though they have been derived from different perspectives or concepetual frameworks (such as the performance responsibilities or functions of teaching, teacher characteristics or behaviors, the demands of society expressed through student and parent needs, the professional roles demanded of teachers, and the application of particular theories of learning and systems of instructional development). Nelli argues further that:

> "However necessary they are for conceptualizing total programs, generic approaches are insufficient for effective program redesign. Classroom teaching does evolve from generic principles, but these are inextricably linked to very specific applications. Separating generic from specific is an artificial device, useful for conceptualizing but not explicit enough for implementing programs." (Nelli, 1981, p. 41)

She presents an analysis of models for curriculum design developed by Gage (1979) and Smith (1980) that exemplify means by which both the generic and specific domains of competencies can be accomodated. With these models, she argues, the power of the generic model as a comprehensive plan for program design can be retained while the need for a means to translate design into practice can be met

through the delineation of competencies that are specific to subject, grade-level, and student-type.

Among the most "scientific" approaches to curriculum development are those that fall within the category of systematic models of instructional design. They are built around the application of a system of logic, a scientific methodology that requires the acquisition of learning data to provide feedback for the revision process and to provide an empirical means of verifying effectiveness. Although this type of design model would appear to provide educators with a valuable planning, organizational and managerial tool for effective design and development, it does not necessarily "fit" the nature of the educating process or address the goals for achieving the enormous range of human activities and concerns that comprise the educating process. Although the systematic instructional design models carry the trappings of science, they frequently fall short in terms of validity. That is, the relationship between the objectives, the form of instruction, and the context of learning exhibit a poor or unknown degree of congruence. After analyzing 40 existing models, Andrews and Goodson (1980) concluded that "unless an educator knows whether or not a particular model has been tried out in an instructional setting, it will be difficult to make a decision about that model's chance of success in the planned setting. Few of the models reviewed supply any data concerning their effectiveness" (p. 12).

A similar situation exists with respect to any of the prescriptions for teacher behavior that might form the basis for the design of objectives for a teacher education program. Medley and Crook (1980) point out that:

> "Those of us who train teachers, who attempt to help them develop into more effective teachers, cannot act directly on teacher effectiveness because we do not have access to the pupils - indeed, we do not even know just who the pupils will be." (1980, p. 294)

Their analysis of the relationship between teacher competence, teacher performance, and pupil learning helps to place the responsibilities of teacher educators in perspective:

"The effects that a teacher has on pupils must be mediated by overt behaviors of the teacher in interaction with those pupils. These behaviors of the teacher will be referred to as teacher performance. Teacher performance, like teacher effectiveness, is not a characteristic of the teacher; it is rather a consequence of a teacher characteristic that is manifest in interaction with pupils. Since teacher performance is the point at which whatever influence the teacher has on pupil learning takes place, it is an important focus of efforts to evaluate instruction. If a teacher is not effective, this is the place to look for the reasons why; this is where a change must take place if the effects are to be changed. Improving teacher performance is the key to improving teacher effectiveness." (Medley and Crook, 1980, p. 294)

"Teaching is performing; it is providing pupils with the opportunity to learn. Its direct purpose is to arrange the contingencies of the classroom so that pupils will have experiences,will engage in activities, favorable to learning. This is the central task of the teacher - to get students to do things that will result in learning. These things may or may not take place in the classroom in which the teacher is teaching; the learning that results from these activities may or may not be immediately apparent.

Evaluation of teacher performance reduces, then, to evaluation of teacher success in performing this, the central task of the teacher. Performance evaluation should focus, then, on the pupil behaviors the teacher elicits, on the "learning experiences" pupils have. A teacher's sucess in performing the task is measured by the extent to which the upils have learning experiences. The concept of "academic engaged time" that has been the objective of considerable study in the Beginning Teacher Evaluation Study is closely related to this idea, but not identical to it.

Teacher performance is determined in part (but only in part) by a characteristic of the teacher which we shall refer to as teacher comptence. Unlike the other two terms we have been using - viz., teacher effectiveness and teacher performance - teacher competence is a characteristic of the teacher independent of the situation in which the teacher is practicing. Competence is what the teacher brings to the situation, and what the teacher takes along when he or she leaves it. The effect of teacher training on how well a teacher performs the teaching task, and (through it) on how effective the teacher is, is mediated by the competence of the teacher. Developing more effective teachers, then, is matter of developing teachers better able to perform the teaching task, that is, developing more competent teachers." (Medley and Crook, 1980, p. 295)

Although teacher effectiveness is not directly accessible to teacher educators, a rational basis for developing the specific objectives for teacher training programs can be derived from an analysis of the components in a given definition of teacher effectiveness. David Hunt (1971) defines teacher effectiveness as:

"the capacity to radiate a wide variety of environments, to select from this variety a specific environment to be radiated toward a particular person or group of persons (with the aim of producing a particular behavioral outcome), and to shift from one environment to another under appropriate circumstances. (Hunt, 1971, p. 52)

Table 25. Training Objectives

Objective	Definition of Objective		
Skill in discrimination	To discriminate between environments $E_x/E_y/E_z$	To discriminate between behaviors $B_1/B_2/B_3$	To discriminate between persons $P_I/P_{II}/P_{III}$
Skill in radiating environments	To radiate a variety of environments E_x: E_y: E_z	To radiate that environment which will produce a specific behavior E_x: $\rightarrow B_1$ E_y: $\rightarrow B_2$	To radiate that environment which will produce a specific behavior from a particular person E_x: $P_I \rightarrow B_1$ E_y: $P_{II} \rightarrow B_3$
Skill in flexible modulation from one environment to another		To shift from one environment to another under appropriate circumstances (Time 1) E_x: $P_1 \rightarrow B_1$ (Time 1) E_y: $P_1 \rightarrow B_3$	

(After Hunt, 1971, p. 53)

From Hunt, David E. and Sullivan, Edmund V. Between Psychology and Education Illinois: The Dryden Press, 1974, p.281.

Several categories of skills were derived from this definition to form a sequential series of training objectives:

> "For example, the trainees should learn skill in discrimination (discriminating between various educational environments, discriminating between various kinds of students, and discriminating between various behaviors). Next, they need to learn skill in radiating environments (to radiate a variety of environments or to present the same lesson in a variety of instructional forms; to radiate that environment which will produce a specific behavior; and to radiate that environment which will produce a specific behavior from a particular person). Finally, trainees should acquire skill in flexible modulation from one environment to another." (Hunt, 1974, p. 279)

The list of objectives in most programs for teacher training reflect a decision to base the design of competencies or prescriptions for teacher behavior on explicit knowledge. Although the source of this knowledge varies, it usually takes the form of prescriptions for decision-making in areas such as the selection and use of strategies for designing and evaluating lessons and units, designing learning activities and materials, writing behavioral objectives, applying approaches to classroom management, etc.

Explicit knowledge in its best form is described by B. O. Smith (1980) as "clinical pedagogical knowledge" - "empirical condition-consequence statements (that) represent practical classroom knowledge, where variables of student achievement, attitudes, or conduct are the consequences" (1980, p. 89).

Other forms of explicit knowledge (that are derived from both research and clinical experience and which may be used to develop the objectives for a teacher training program) include generic and specific definitional and clinical pedagogical knowledge. (Smith, 1980)

David Hunt (1971) describes explicit knowledge as generalizations regarding the relationship between environment, person, and behavior variables that take the form of "matching model principles." The most well-developed examples of prescriptions for the design and implementation of particular types of educational environments (intended to help particular types of students accomplish given learning task

objectives) may be found in the "Models of Teaching" created by Joyce and Weil (1972).

Although the identification of generalizations that suggest cause and effect relationships between environment and learner characteristics seem to be an appropriate and useful basis for developing training objectives for teachers, the way in which such prescriptions are approached can present some problems. Hunt (1980) describes some of the alternatives:

> "To match teaching style with learning style seems so obviously beneficial, yet it is not simple. Matching can be seen in many different, often contradictory, ways, and these views of matching are closely related to one's beliefs about education, about teaching and learning, and about how much students and teachers can change.
>
> Formal vs. intuitive matching. Like almost every education "Innovation," matching is nothing new to experienced teachers who have been intuitively matching their students all along. Rather than rely on teachers' intuitive knowledge, most formal matching models use logical derivation and research evidence to support their claims for matching statements which coordinate specific student learning styles with corresponding teaching styles/approaches.
>
> Formal matching models need more than tight logic and weighty evidence to influence classroom practice directly; they must be compatible with teachers' intuitive matching. Put another way, since teachers must translate formal matching into their practice, these formal ideas should be expressed in forms or metaphors compatible to those of teachers.
>
> But what is the metaphor used by a teacher in intuitive matching? Although teachers rarely explicate their matching ideas, their continuous attempts to understand and modulate to their students seems to resemble a metaphor of conversation or communication. Yet the recent National Association of Secondary School Principals (NASSP) monograph on learning style (1979) bears formal matching in a medical metaphor which is incompatible with how most teachers think about or carry out intuitive matching. One way to cope with this contradiction in metaphor is to begin by identifying the implicit matching models used by teachers.
>
> Functional vs. developmental matching. Learning style may be considered an unchanging student characteristic to which educational environments should be adapted (functional matching) or it may itself be considered an objective for long term change and enhancement (developmental matching). In working with a student whose most accessible channel is visual, do we provide only visual material (functional) or intentionally use approaches through other modalities (developmental)? George Stern's frequently quoted metaphors of contented cows and aggravated oysters exemplify, among other things, an emphasis on functional and developmental matching, respectively.
>
> Preferred vs. required matching. Is student learning style (and the appropriately matched teaching style) identified by the student's own preference or by the judgment of someone else about what the student needs or requires? Students are often asked to express a preference

without adequate experience of the educational options offered as alternatives.

Teacher style vs. teaching approach. The educational environment in matching may be considered in terms of a teacher's preferred style which is often limited and unchanging, or as a teaching approach to be provided which may require the teacher to go beyond the teacher's preferred style.

Unilateral vs. reciprocal matching. We usually think of matching in terms of the unilateral effect of teachers or teaching on students, yet students also exert an influence on teachers so that matching becomes a reciprocal, two-way process. Unilateral matching is like a medical prescription dispensed to a patient without regard to the influence of the patient on the diagnosis or how the prescription will work when the patient changes. This is the UFO model: Unilateral, Fixed, and Objective. By contrast, reciprocal matching acknowledges the give-and-take between student and teacher in a metaphor of orchestrating two instruments playing together or spontaneously alternating variations on a theme.

Some teacher/learner matches can result in a mismatch. At times this can be beneficial. Individuals can learn certain stylistic behaviors and add them to their repertoire. This arrangement is often necessary because of the varied demands from our environment. Mismatch can also be harmful. Any given environment may be comfortable for one person while placing frustrating and painful burdens upon another.

Mismatch can also have an effect upon the teacher. Teachers whose teaching styles closely approximate their major learning preferences report comfort, ease, and authenticity. Those who venture into minor areas indicate ranges of ease through mild discomfort. Those who consistently instruct via minor styles report feelings of awkwardness, lack of efficiency and authenticity, and pain--mental and physical.

It has been found that periodic mismatch of major preferences can be tolerated and even viewed as acceptable, as varietal, as challenging. On the other hand, prolonged and chronic mismatch can result in stress, even burnout." (Hunt, 1980)

A number of criticisms have arisen with regard to the reliance upon explicit knowledge as a sufficient basis for the design and development of effective teacher education programs. Williams, Neff,and Finklestein (1981) propose a "contextual approach to professional development" that would give more attention "to the teacher as an active inquirer continuously framing and testing hypotheses, gathering data, and "making meaning" from ongoing routine experiences" (1981, p. 95).

This approach would emphasize "tacit knowing" as the basis for a new set of methodological tasks for the teacher-researcher.

> "Unlike explicit knowledge which is analyzed by studying only observable behavior, tacit knowledge is embedded in experience. The study of experience is a process which requires an exploration and description of experiences, experiencers, and environments as they occur in everyday life.

The element of experience which most typifies everyday life in education settings is decision making. Educator decisions include both those which are consciously considered prior to action (based on explicit knowledge) and those which are made on the spot—the moment to moment, "common sense" decisions (based on tacit knowledge). It is this latter type of decision which is most common and which, we are convinced, may have the greatest impact on education. Because these decisions are not "actively considered decisions," they often, on the surface, lack consistency. In fact, this sometimes results in a dichotomy between what the educator believes and a specific decision the educator makes.

The writers of this article are well aware that it is neither possible nor desirable to base all decisions on explicit knowledge. It is, however, suggested that the more an educator is able to reflect on tacit knowing and thus make "more intentional" decisions, the greater the likelihood that important changes can be made in education.

Virtually all attempts to link theory and practice have, as Phillips (1980) suggests, met with limited success. These failures have not been the fault of researchers or practitioners, nor have they been the fault of the methods and materials used. The failures lie, rather, in the traditional conception of educational research as an element of theory which is distinct from practice. An example of this is reflected in the common assertion made by practitioners that the theory generated through research, while interesting, does little to inform or ultimately improve practice. It is further evidenced in the everyday language of educators which refers to researchers as an elite group of scholars and to practitioners as a less sophisticated type of profesional (Sanders and Schwab, 1979).

The alternative proposed here is an approach to professional development which can enable educators to become more conscious of the decisions they make—in a sense, to become researchers. This approch is based on the assumption that, by becoming aware of a decision being made, and by being able to review the way the decision interfaces with a given context, the knowledgeable educator can make wiser and more effective decisions.

Hunter (1971) often refers to "bringing behavior to the conscious level." It is her contention that, until teachers are aware of their actions, they are unable to extend, modify, accelerate, or terminate those actions. She also maintains that, until teachers are conscious of their decisions, additional information about teaching and learning cannot improve the quality of education. Thus, helping teachers to understand teaching as a process of decision making must be a central thrust of any professional development program. They must be helped to become more conscious of context and the way in which their decisions interface with that context. Finally, given this consciousness of their actions and their knowledge about teaching and learning, they must be helped to generate alternative decisions which might be appropriate.

Any effort to make more explicit the decisions which educators make must, of course, start with educators themselves. It is important that each educator understand the multiple factors in his life which are part of his actions. He must become aware that what he sees or senses (perceives) in an interaction and the way in which he participates in that interaction are affected by the contexts of which he is a part (Combs 1974). He must understand that professional decision making is an active process—that each change in his life context (no matter how small) changes the way in

> which he views an experience or makes a decision—a phenomenon similar to what Bleicher (1980) describes as the hermeneutic principle. In this sense, the educator is both a consumer and a producer of research (Combs, 1974; Tyler and Goodlad, 1979; Bleicher, 1980)." (Williams, Neff, Finklestein, 1981, p. 95)

Sanders and Schwab (1980) point out that:

> "The absence of reliable knowledge about the consequences of teacher action is a fundamental fact of educational life." (1980, p. 272)
>
> "Each of the large and small decisions or judgments that a teacher must make is necessarily based on incomplete information about the prior experience, learnings, attitudes and meanings which underlie a particular student's behavior in the classroom. Rarely does the teacher have available sufficient information about the probable impact of any specific act on a child's comprehension or behavior. Tools do not exist for diagnosing problems or for predicting the effects of specific interventions at a level of detail useful to teachers." (1980, p. 271)

Both Sanders and Schwab (1979) and Doll (1979) also offer alternative designs for pedagogical inquiry and curriculum development in teacher education that are based on the epistemological view that knowledge is constructed; not "given." The models of the inquiry process and the design of a strategy for analyzing and evaluating teaching effectiveness that follow are attempts to operationalize the principles of "developmental research" outlined by Sanders and Schwab (1979, p. 355) and the "structural curriculum model" outlined by Doll (1979, p. 343).

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